

PS The Autogenic Origin and Sequence Stratigraphic Setting of the Eocene Cocoa Sand Member of the Yazoo Formation in the Mobil-Mississippi Cores, Wayne County, Mississippi*

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Abstract

The Eocene Cocoa Sand Member of the Yazoo Formation of Mississippi is a subrounded to subangular, moderately to well sorted, poorly cemented quartz arenite with a composition of Q96 F0 L4. Embayed and subhedral quartz grains are common. Lithic fragments are largely found at the base of the Cocoa Sand Member at the contact with the underlying North Twistwood Creek Member of the Yazoo Formation. These lithic fragments consist of sedimentary rock fragments and are interpreted as rip-up clasts from the underlying quartz-rich mudstone.

Previous work has interpreted the Cocoa Sand Member as shelf margin sand deposited as part of a lowstand systems tract. The presence of rip-up clasts at the base of the Cocoa sand member supports the presence of a transgressive surface at the contact with the North Twistwood Creek. In addition, there is evidence that the upper contact of the Cocoa Sand with the Pachuta Marl is a sharp contact, representing an upper erosion surface.

We interpret the Cocoa Sand Member of the Yazoo Formation to be an autogenic sand sheet deposited as part of a transgressive systems tract. During transgression, the North Twistwood Creek Member was cannibalized, sediment reworked, and re-deposited with rising sea level.



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ABSTRACT

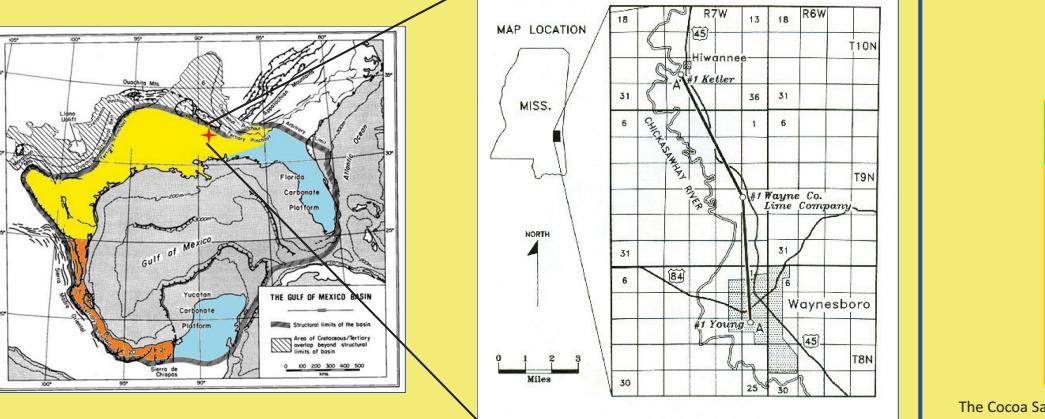
The Eocene Cocoa Sand Member of the Yazoo Formation of Mississippi is a subrounded to subangular, moderately to well sorted, poorly cemented quartz arenite with a composition of $Q_{96} F_0 L_4$. Embayed and subhedral quartz grains are common. Lithic fragments are largely found at the base of the Cocoa Sand Member at the contact with the underlying North Twistwood Creek Member of the Yazoo Formation. These lithic fragments consist of sedimentary rock fragments and are interpreted as rip-up clasts from the underlying quartz-rich mudstone.

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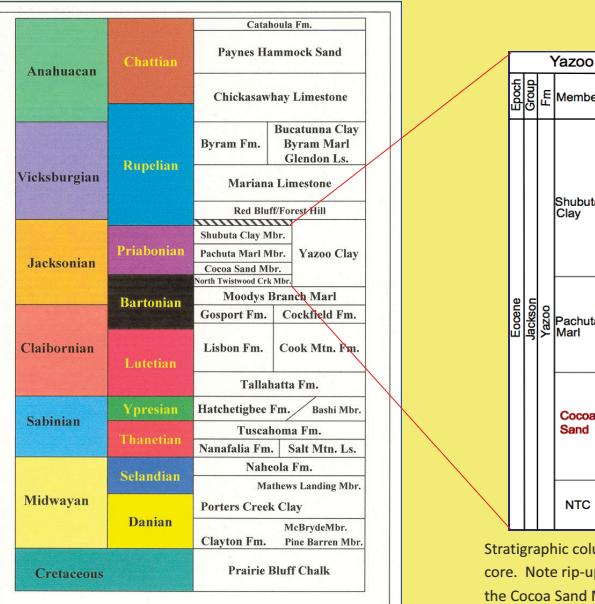
LOCATION OF STUDY

Location within Gulf Coastal Plain

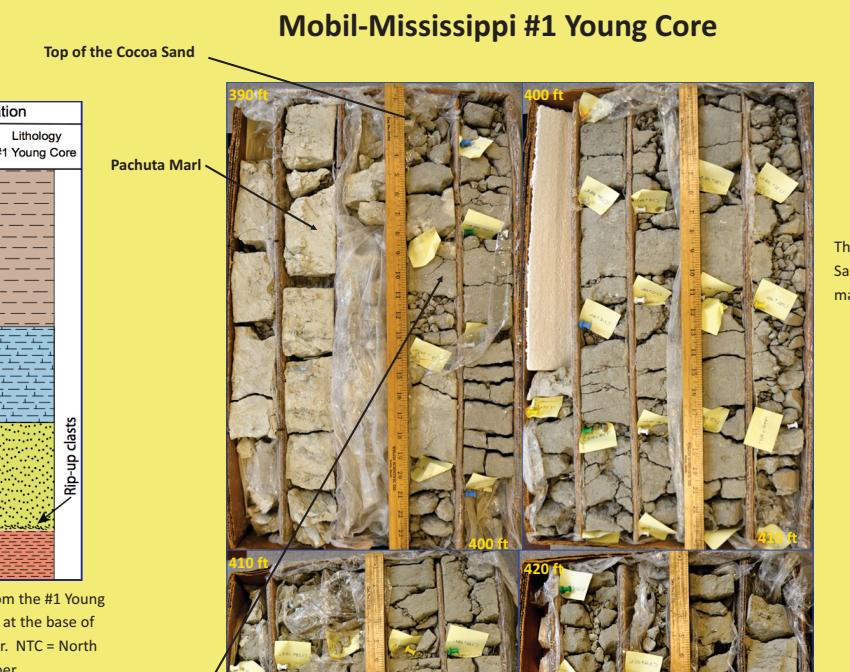


The Yazoo Formation is part of the Jackson Group, which extends in outcrop from southwest Alabama, northwest to Yazoo County, Mississippi. The Mobil-Mississippi drilling project is located in Wayne County, Mississippi and resulted in core from the #1 Ketter, #1 Wayne Co. Lime Company, and the #1 Young wells (after Dockery et al., 1994). Only the #1 Ketter and #1 Young wells penetrated through the Cocoa Sand Member of the Yazoo Formation.

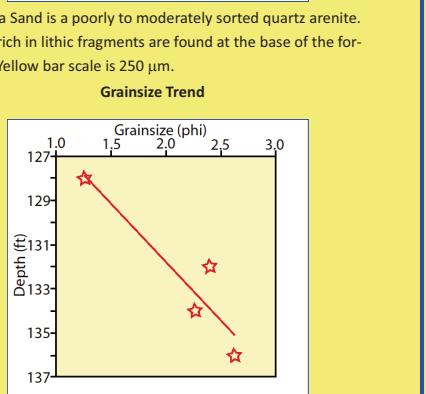
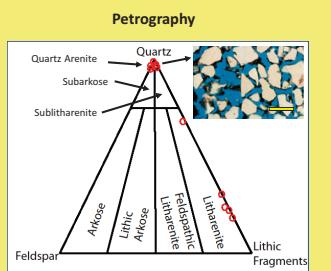
STRATIGRAPHY



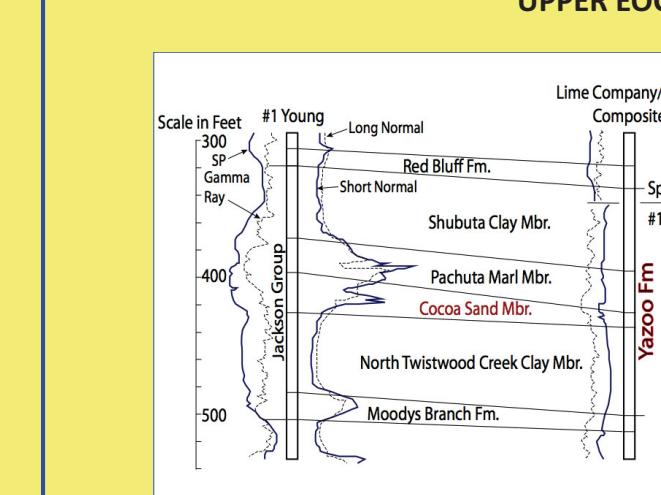
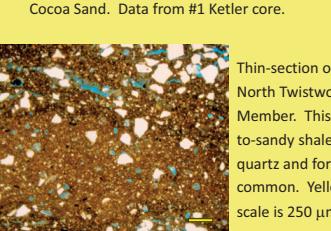
Paleogene of the Eastern Gulf Coastal Plain



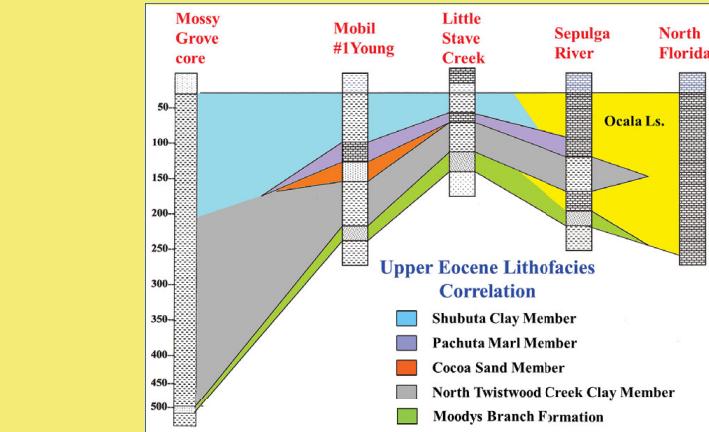
Mobil-Mississippi #1 Young Core



A Coarsening upward trend defines the Cocoa Sand. Data from #1 Ketter core.



UPPER EOCENE LITHOFACIES CORRELATION

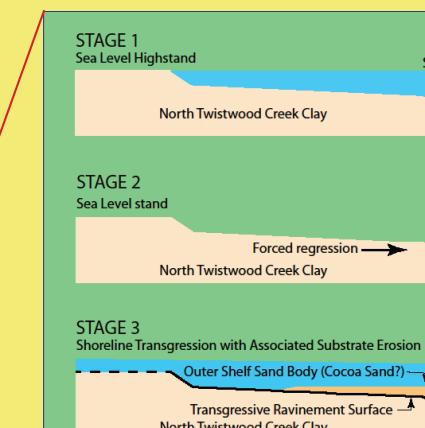
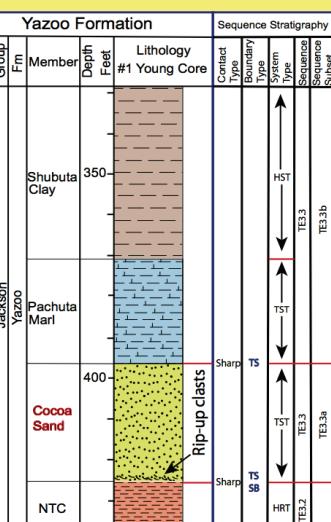


Lithofacies correlation between the #1 Young and the #1 Lime Company/#1 Ketter composite wells (after Dockery et al. 1994). The Cocoa Sand Member thickens from the north to the south in this small sampling. More mapping is necessary to fully understand its distribution. Note the coarsening upward expression of the SP and Gamma Ray logs.

DISCUSSION

There is no argument that a sequence boundary occurs at the North Twistwood-Cocoa Sand contact (Baum and Vail 1988; Miller et al. 2008). The question arises as to the source and deposition of the Cocoa Sand in the middle of a thick mud sequence. The sand has been interpreted as part of a shelf margin systems tract (Echols et al. 2003) and as part of a transgressive systems tract (Mancini 2000). Our research is at the initial stages and is investigating the hypothesis that the Cocoa Sand is part of the transgressive systems tract, with its source being the erosion and reworking of the North Twistwood Creek Member during transgression. Early evidence supports this hypothesis, but there is more work to do before a final conclusion can be made.

SEQUENCE STRATIGRAPHY AND HYPOTHESIZED MODEL



Stage 1 represents a time of sea level highstand and deposition of the North Twistwood Creek Member. At stage 2 sea level fall has exposed the sea floor and the shore line moves seaward. At stage 3, transgressive forces erode the sea floor (North Twistwood Creek Member) winnowing away the clays and leaving behind a sand ridge (?) that thins toward the new shoreline (Cocoa Sand Member).

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Dockery, D.T., III, Thompson, D.E., and Ingram, S.L., 1994, The Mobil-Mississippi Office of Geology Hole Project: Mineral Geology, v. 15, p. 8-10.

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